

**ENERGY STAR® Testing Facility Guidance Manual:**  
**Building a Testing Facility and Performing the Solid State Test**  
**Method for ENERGY STAR Qualified Ceiling Fans**



**Version 1.1**  
**Rev. 8/09**

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# **ENERGY STAR® Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans**

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**This test manual will be updated and augmented as necessary in response to changes in testing requirements and specifications under the ENERGY STAR Program Requirements for Residential Ceiling Fans.**

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**EPA would like to thank all those interested parties who contributed comments during the development of this document, especially Natural Resources Canada.**

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# **CHAPTER 1**

## **Introduction**

### **1.1 Background**

ENERGY STAR is a self-certifying, voluntary program that manufacturers can join to qualify and label their energy-efficient products. Where possible, ENERGY STAR adopts existing testing procedures when developing product specifications and testing criteria. However, there was no standardized test method available to the ceiling fan industry at the time of specification development for this product.

In 2001, EPA partnered with Hunter Fan Company to develop the Solid State Test Method. This test method is designed to increase efficiency and improve accuracy. It provides an accurate representation of the air circulation created by the fan in the room. The method reduces the testing and validation time to a fraction of the time period required by other industry testing standards.

The Solid State Test Method allows for the measurement of total cubic feet per minute (CFM) and CFM/watt readings for multiple fan speeds. These results must meet the minimum requirements provided in the ENERGY STAR specification (Attachment A). As of January 2001, all fans must be tested in accordance with the Solid State Test Method to qualify as ENERGY STAR.

The Solid State Test Method was provided by Hunter Fan Company as non-proprietary and is subject to improvements as technologies change and standard operating procedures are re-evaluated.

### **1.2 Purpose**

The purpose of this guidance manual is to provide ENERGY STAR partners and other interested parties, such as third party laboratories, the necessary information needed to build a ceiling fan testing chamber, or air delivery room, and perform adequate product testing for ENERGY STAR qualification. It is important to note that this manual provides the minimum requirements for building the test facility. Engineering designs may vary outside of these minimum requirements. The testing criteria and procedure, however, shall be followed closely in order to ensure consistent results across the board.

This following information is provided in this manual:

- List of equipment and reference vendor contacts
- Air delivery room construction and set-up
- Equipment set-up and CFM test procedure
- Approval process, programmatic requirements, and required forms
- ENERGY STAR specifications
- Blueprints for air-delivery room

### 1.3 Applicability

Any ceiling fan manufacturer, third-party testing facility, or other interested party may build a ceiling fan test chamber. All testing facilities intending to test residential ceiling fans under ENERGY STAR requirements must follow the facility blueprints and additional building instructions as well as the test procedures provided in this manual. **Please note that this is not an EPA certification and individuals shall not attempt to identify themselves as an EPA certified laboratory.**

Third-party testing facilities and laboratories should already be accredited or recognized by an independent laboratory certification organization (e.g., UL, Intertek Testing Services) to conduct testing and review test results. For those facilities that are not already accredited or recognized, a facility inspection will be required prior to approval of the facility. Representatives from EPA and an existing ceiling fan testing laboratory, approved to test for ENERGY STAR qualification, will conduct this inspection to ensure the proper procedures and reporting requirements are in place.

## CHAPTER 2

### List of Equipment and Vendors

The table below provides a list of the testing equipment needed to perform the Solid State Test Method. EPA does not endorse the products or vendors listed in the table below, but provides this information to offer examples of devices that meet the functional requirements of ceiling fan testing. Any precision control equipment that performs similar functions, but is sold under a different brand name, is acceptable. All instruments except velocity sensors should have tolerances within  $\pm 1\%$ . Velocity sensors should be rated for  $\pm 5\%$  accuracy and standard flow ranges of 0.15 to 10 m/s (approximately 30 - 1969 fpm). **Note:** All equipment used to measure fan performance shall be calibrated in a traceable manner at least once a year to compensate for variation over time.

Function	Suggested Equipment Name/Type	Serial/ Model Number of Suggested Equipment	Vendor Contact
Timer	Robic Stop Watch	56964 / SC-505	
Measure airflow and temperature at multiple locations simultaneously. Accuracy must be within $\pm 5\%$ or better. Standard flow range must be from 0.15 to 10 m/s (approximately 30 - 1969 fpm).	Cambridge Accusense Air Velocity and Air Temperature Sensors  Kit: <ul style="list-style-type: none"> <li>▪ ATM-24 instrument</li> <li>▪ Accutrac Software (PC only) or Kermit (Mac only)</li> <li>▪ 5V Universal Power Supply with AC power cord</li> <li>▪ RS-232 cable</li> <li>▪ Carrying case</li> <li>▪ Plastic mounting clips for CAFS sensors</li> <li>▪ CAFS sensors</li> </ul>	0135-992832-001 / ATM24  CAFS F900 P5122	Degree C Tel: +1 (603) 672-8900 Toll-free: +1 (877) 334-7332 <a href="http://www.degreec.com">www.degreec.com</a> <a href="mailto:rick.melloy@degreec.com">rick.melloy@degreec.com</a> See website for specific country telephone numbers and addresses.
Measure amps, watts, power factor, voltage	Extech True RMS Power Analyzer	NA / 380801	<a href="http://www.extech.com">www.extech.com</a> Tel: +1 (781) 890-7440 ext.220
	Magtrol Power Analyzer	6510E	<a href="http://www.magtrol.com">www.magtrol.com</a> See website for specific country telephone numbers and addresses.

Measure temperature, barometric pressure, and humidity within testing facility	Vaisala Combined Pressure, Humidity and Temperature Transmitter	PTU300	<a href="http://www.vaisala.com">www.vaisala.com</a> See website for specific country telephone numbers and addresses.
Infrared beam counter	Shimpo Digital Tachometer	10049812 / DT-5TG	Shimpo Instruments Division of NIDEC-Shimpo America Corporation Tel: +1 (630) 924-7138 Toll-free: +1 (800) 237-7079 <a href="http://www.shimpoinst.com">www.shimpoinst.com</a>
	Shimpo Retro-Reflective Beam Sensor	H9 / RS-220H	
	Omron Metal Body Sensor	E3S-CT61	
Raise and lower ceiling fan	Actuator Arm and Drive Mechanism	NA / KBPI-24OD(R)(8501)	KB Electronics, Inc. Toll-free: +1 (800) 221-6570 <a href="http://www.kbelectronics.com">www.kbelectronics.com</a> <a href="mailto:info@kbelectronics.com">info@kbelectronics.com</a>
Testing cylinder	Testing cylinder	60" CFM Aluminum Chamber TD#8067*	Custom Projects Inc. 333 E. Brooks Rd. Memphis, TN 38109 Tel: +1 (901) 396-7398 Fax: +1 (396) 396-7399 Contact: Randy Jones <a href="mailto:customprojects@bellsouth.net">customprojects@bellsouth.net</a>
Rotate arm upon which sensors are mounted	Mechanical Arm Rotator (for example, an antenna rotator)	YAESU G-800S	Radiomart Tel: +1 (716) 632-1189 Fax: +1 (716) 632-6304 <a href="mailto:radiomart@buffalo.com">radiomart@buffalo.com</a> <a href="http://www.radiomart.com">www.radiomart.com</a>
Sensor mount	Arm as shown in Figure 3.9	Custom-manufactured	Custom Projects Inc. 333 E. Brooks Rd. Memphis, TN 38109 Tel: +1 (901) 396-7398 Fax: +1 (396) 396-7399 Contact: Randy Jones <a href="mailto:customprojects@bellsouth.net">customprojects@bellsouth.net</a>

\* Ordering of multiple sized cylinders should be considered to accommodate more than one fan size.

## CHAPTER 3

### Air Delivery Room Construction and Preparation

#### 3.1 Air Delivery Room Requirements

The air delivery room, or testing chamber, shall be constructed per the blueprint provided in Appendix D. The room dimensions are recommended to be approximately 20 ft. x 20 ft. with an 11 ft. high ceiling. **Note:** The control room shall be constructed external to the air delivery room.

The ceiling shall be constructed of sheet rock or stainless plate. The walls shall be of adequate thickness to maintain temperature and humidity during the test. It is important that the type of paint used on the walls, as well as the wall material, not absorb humidity while keeping the temperature of the room consistent at the time of testing. Oil based paint, which prevents absorption of humidity in the room, is preferred although other means of controlling humidity and temperature are acceptable.

#### **Room Ventilation**

The room shall have no ventilation other than the air conditioning and return. The air conditioning is used to control the temperature and humidity of the room (see Chapter 4 for requirements). At the time of construction of the room, means should be provided to close the air conditioning vents inside the room to ensure consistent air circulation patterns within the room.

Closing all vents during testing increases the accuracy of air flow and the reading of the air velocity sensors. It is therefore recommended that air conditioning vents be closed during testing. **Note:** It is preferred to have electronically operated damper doors for the vents that can be controlled from a switch outside of the testing room.



## 3.2 Equipment Set-Up

### Supportive Ceiling Rails

The ceiling rail tracks, used to support and move the testing cylinder, shall be installed as shown in Figures 3.1 – 3.3.



Figure 3.1 – Rail Track in Ceiling

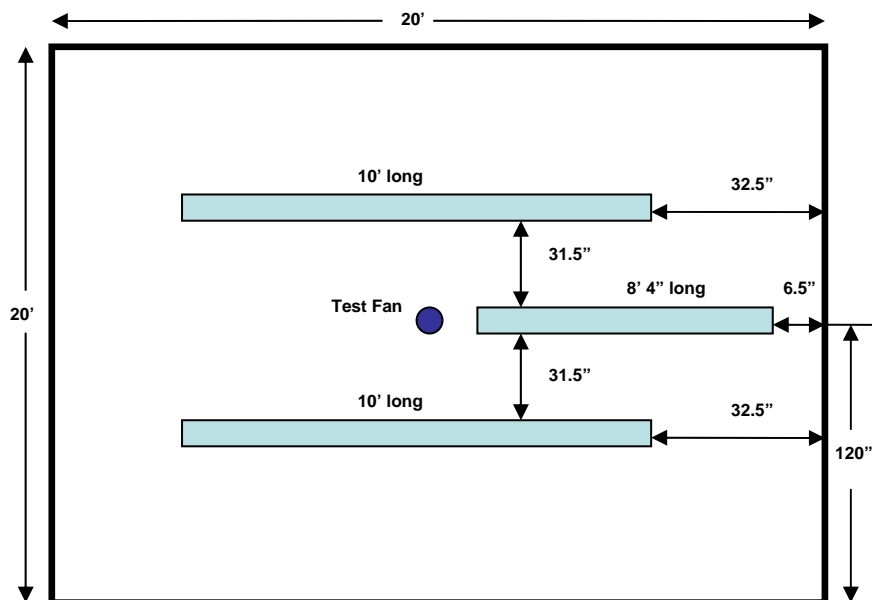


Figure 3.2 – Rail Measurements and Details



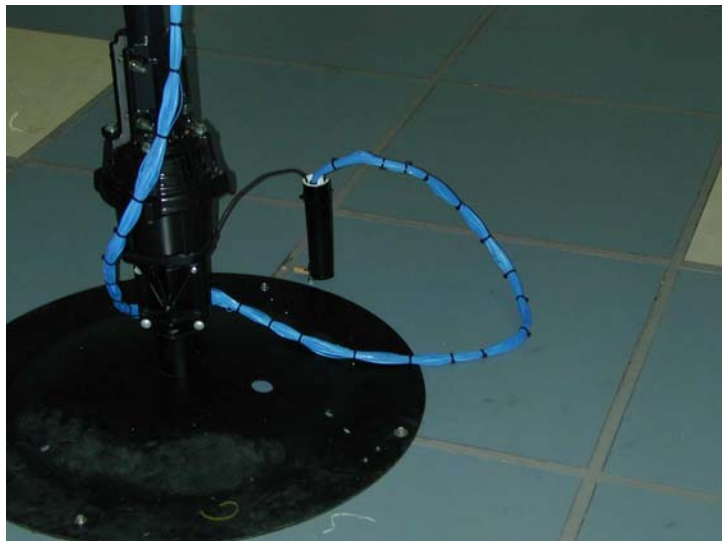
**Figure 3.3 – Test Cylinder and Rail Track Support**

### **Wiring**

The amount of exposed wiring shall be minimized. All sensor lead wires should be stored under the floor, if possible (Figure 3.4, below).

### **Sensors and Sensor Rotating Arm**

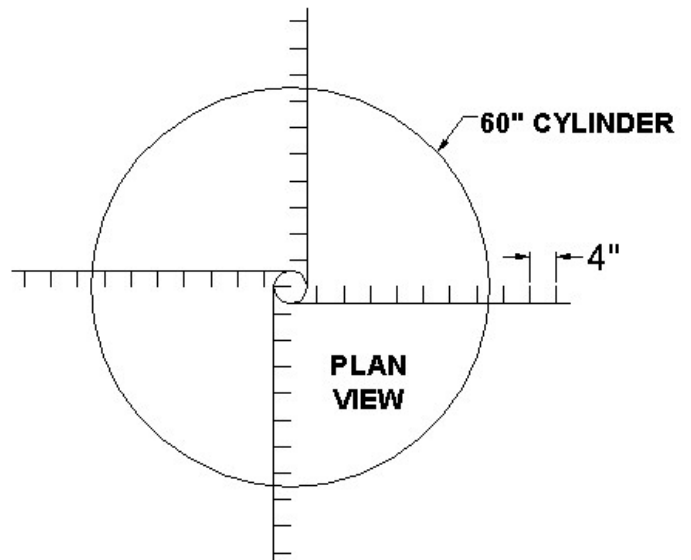
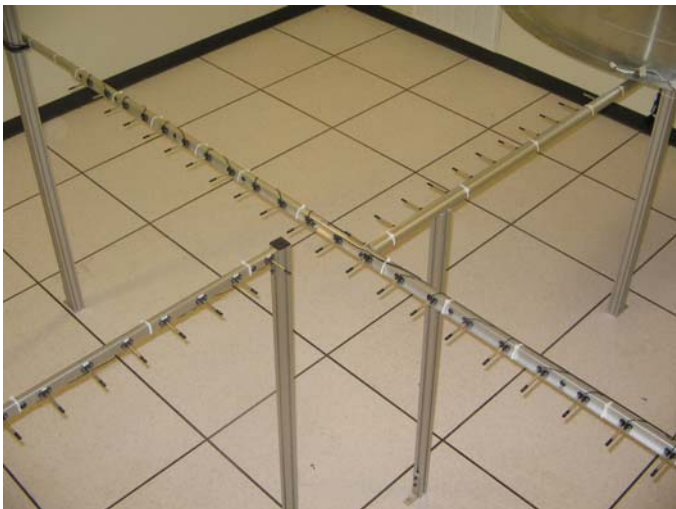
The sensors shall be placed at exactly 4-inch intervals. Sensor placement is shown in Figure 3.5, below. **Note:** It is extremely critical that the actual sensor not be touched prior to testing. Enough sensors shall be used to record air delivery to the end of the testing cylinder as shown in Figure 3.6.



**Figure 3.4 – Arm Rotator with Sensor Wires Covered (if using single rotating arm instead of four fixed arms)**



**Figure 3.5 – Sensors Mounted in Testing Position**



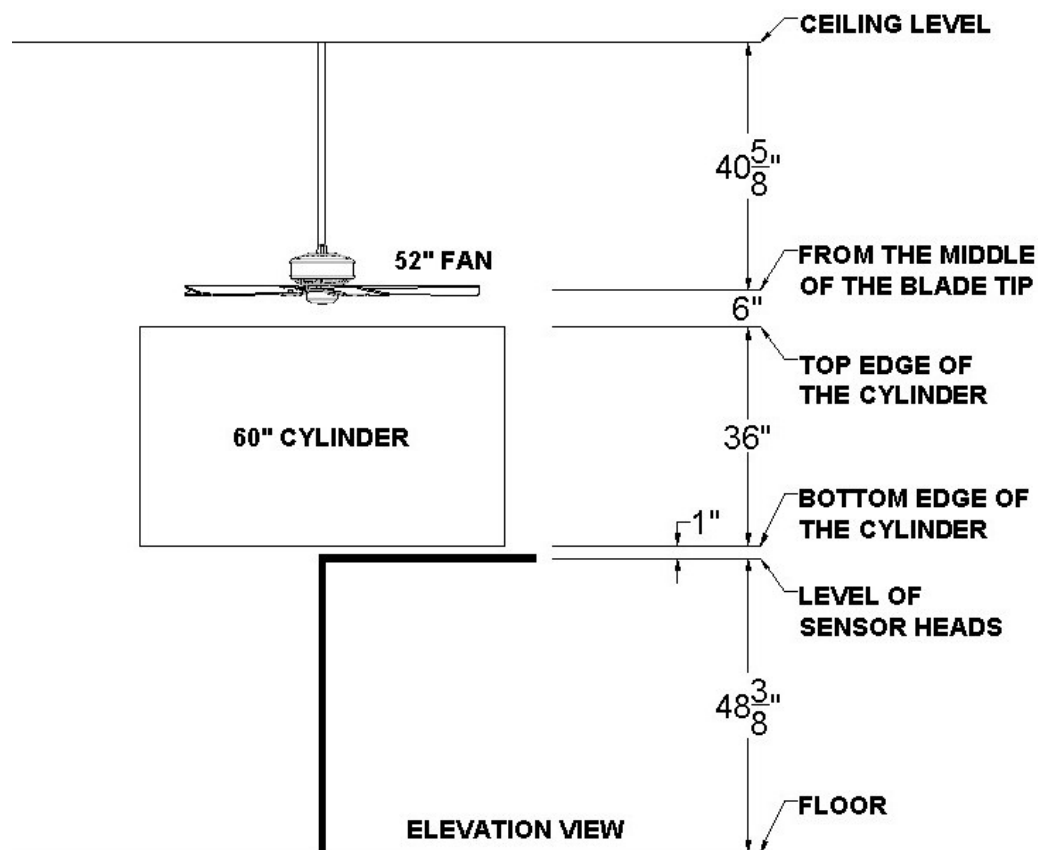
**Figure 3.6 – Sensors and Sensor Arms (if using four fixed arms instead of single rotating arm)**

### **Test Cylinders**

The test cylinder hangs from the ceiling rails as shown in Figure 3.3. Test cylinders must be eight inches (diameter) larger than the fan model being tested. For example, a 52-inch fan should be tested within a 60-inch cylinder. Also, no inside seam of the test cylinder shall be directly aligned with the velocity sensors when measuring airflow. Proper cylinder set-up is shown in Figures 3.7 – 3.9, below. Table 3.1, below, shows the appropriate cylinder size and number of sensors to use for each fan size.



**Figure 3.7 – Testing Cylinder, Sensors, and Sensor Arms (if using four fixed arms instead of single rotating arm)**



**Figure 3.8 – Air Delivery Room Set-Up with 60" Cylinder**



**Figure 3.9 – Testing Cylinder and Chamber (if using single rotating arm instead of four fixed arms)**

Fan Size (in.)	Cylinder Diameter (in.)	Number of Sensors	Comments	Circle area factor of last sensor
36	44	6		
42	50	7	The effective area of last sensor will have circle width of 3"	3.0761
44	52	7		
48	56	7	The effective area of last sensor will have circle width of 6"	6.5449
52	60	8		
56	64	8	The effective area of last sensor will have circle width of 6"	7.5922
60	68	9		

**Table 3.1 – Cylinder and Sensor Selection Guide**

## CHAPTER 4

### Equipment Set-Up and Test Procedure

This chapter provides general instructions on setting up the equipment and performing the ceiling fan test. Lab personnel shall refer to equipment manuals for specific instructions.

#### 4.1 General Instructions

Listed below are some important things to remember when testing. These points are described in further detail in Section 4.3.

- The temperature and humidity setting shall be  $70 \pm 5$  degrees F, and  $50 \pm 5\%$  relative humidity – these shall be held constant during entire test process (Figure 4.1)
- Allow the sensors to be turned on and the fan to run for 30 minutes at its first and lowest speed setting, and 15 minutes at each subsequent fan speed/setting before taking readings.
- If present, light fixture should be turned off during testing.



**Figure 4.1 – Temperature and Humidity Sensors in Testing Room**



**Figure 4.2 – Tachometer Set-Up**

#### 4.2 Tachometer Set-Up

The installation of the RPM meter, or tachometer, is shown in Figure 4.2, above.

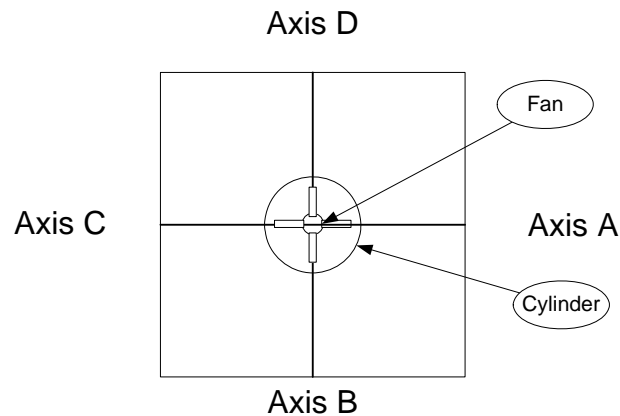
#### 4.3 Fan Set-Up and Testing Procedure

**Step 1:** Make sure the transformer power is off. Hang fan at the actuator hanging system and connect black and white wires from ceiling to fan. Ignore other wires, until further notice. **Note:** Fan will need to be assembled prior to the test; it is important that lab personnel follow the instructions provided by the fan manufacturer. If during set-up it is discovered that not all of the blades meet the 6" height above the cylinder requirement, an average shall then be taken of all of the blade heights, which then must meet the 6" requirement. While determining the average height, the maximum variation in height of each individual blade from the edge of the cylinder should be limited to 0.5". If this is exceeded, the manufacturer shall then be required to send another fan for testing.

**Step 2:** Slide the metal cylinder to the center such that the fan is hanging above and exactly in the center of the cylinder. As mentioned in Chapter 3, test cylinders must be a total of eight inches larger than the fan model being tested.

**Step 3:** Adjust the actuator such that the middle of the blade tip is 6 inches above the top edge, or lip, of the metal cylinder (see note on p. 10). If necessary, use the Penta-Drive hoist's toggle switch and adjust height. **Note:** If not all the blades are the same distance from the cylinder, adjust them until there is no fan wobble when the fan is in operation.

**Step 4:** Set the first sensor arm (if using four fixed arms) or single sensor arm (if using a single rotating arm) to the 0 degree Position (Axis A). Axes B, C and D are at 90, 180 and 270 degree positions relative to the arm. If necessary, use black tape marking as reference. To adjust beam alignment use antenna rotator by pressing the **LEFT** and **RIGHT** rocker switch. **Note:** Axes A – D can be designated either by using the four walls or four corners of the room. It is important that all axis points are equidistant from one another. See Figure 4.3, below.



**Figure 4.3 – Testing Room and All Four Axes**

#### 4.4 Accutrack Software Instructions: Reading the Sensors

- Connect sensors as instructed in the Cambridge Airflow Temperature Monitor instruction manual
- The setting of the software shall be as follows (appropriate COM port of computer):
  - Statistics: Avg., Min., Max.
  - Probe: Gen'd
  - Prob Grid: (0X0)
  - Reading Interval: 1 second
  - Option Menu: (Altitude compensation: enter altitude, time unit second, airflow units FPM)





**Figure 4.4 – Ceiling Fan Testing Set-Up**

#### 4.5 CFM and Power Consumption Testing Procedure

Listed below are the basic steps of the ceiling fan test. Figure 4.4, above, shows a ceiling fan during an air delivery test. Measurements should be recorded at the resolution of the test instrumentation.

**Step 1:** If using a single rotating arm, rotate the sensor arm to Axis A.

**Step 2:** Load Accutrac Software. **Note:** The software shall be set up for 1 sec reading and for air velocity only, not for temperature. Insert current barometric pressure.

**Step 3:** Allow test fan to run 30 minutes at rated voltage and lowest frequency (speed), close all doors and turn off all environmental conditioning equipment entering the chamber (e.g., air conditioning), and wait an additional 3 minutes prior to starting test session. **Note:** Efforts should be made to ensure that temperature and humidity readings are held within the required tolerances (see Chapter 4, section 4.1) for the duration of the test (all speeds). For example, it may be helpful to turn on environmental conditioning equipment between test sessions to ready the room for the following speed test.

**Step 4:** Start the session and begin recording readings. Take 100 readings (100 seconds run-time) and save the file to Data A. **Note:** When the session has started recording, make sure that only FPM are recorded; there is no need to record temperature readings.

**Step 5:** Similarly take the readings in Axis B, C, and D; these files will be saved as Data B, Data C, and Data D, respectively.

**Step 6:** Take the average value of each sensor and fill in the appropriate calculation spreadsheet shown in Appendix C.

**Step 7:** Repeat steps 1 through 6 above for the remaining fan speeds. However, instead of allowing the fan to run for 30 minutes, allow it to run for 15 minutes prior to taking measurements.

To measure ceiling fan power consumption during the CFM test, position an RMS sensor capable of measuring power with an accuracy of 1% at a point that includes all power consuming components of the ceiling fan (with any attached light kit powered off). After continuously measuring power at the rated voltage that represents normal operation over the duration of the airflow test, record the average power consumption in watts, and round to the nearest whole number as follows:

- (i) A fractional number at or above the midpoint between two consecutive whole numbers shall be rounded up to the higher of the two whole numbers.
- (ii) A fractional number below the midpoint between two consecutive whole numbers shall be rounded down to the lower of the two whole numbers.

After rounding, use the resultant figure with the corresponding CFM measurement to calculate the airflow efficiency in CFM/W.

## CHAPTER 5

### Calibration Approval and Reporting Test Results

#### 5.1 Approval to Begin Testing for ENERGY STAR

Before accepting and testing fans for ENERGY STAR testing, the following requirements must be met:

- Review all ENERGY STAR Documents

All testing facility personnel are required to review this testing guidance manual, and blueprints, as well as the ENERGY STAR Eligibility Criteria (Appendix A) and Qualified Product Information Form (Appendix B).

- Test Facility Site Inspection

As mentioned in Chapter 1, facilities that have not previously been accredited or recognized by an independent laboratory certification organization (e.g., UL, Intertek Testing Services) will require a facility site inspection by EPA and approved laboratory representatives. Facilities will be asked to provide proof of lab approval or recognition to be relieved of this requirement. EPA should be notified when the construction of a test facility has been completed and requires an inspection.

- Fan Calibration

To ensure consistency between all participating laboratories, each proposed testing facility must calibrate with one of the existing testing laboratories (i.e., those that have been approved to test ceiling fans for ENERGY STAR qualification). The proposed testing facility must request from EPA a Standard (52") Calibration Fan. EPA will ship the Standard Calibration Fan to an existing testing laboratory for calibration. The existing testing laboratory will then ship the Standard Calibration Fan to the proposed testing facility for calibration. Once the calibration is complete, the proposed testing facility must return the fan to EPA.

**Note:** proposed testing facility must bear all shipping costs by setting up an account number for use by EPA and the existing testing laboratory or by providing the required shipment paperwork with the request. Air delivery results at the proposed testing facility **must be within +/- 5%** of the existing testing laboratory results.

Calibration instructions:

1. Assemble fan according to directions provided by existing testing laboratory. **Note:** it is important to follow directions as to where to attach blades and brackets. These locations will be numbered and documented by existing testing laboratory. Also, ensure the blade degree pitch for all blades is set to the manufacturer's specification, adjusting if necessary.

2. Hang the Standard Calibration Fan in the air delivery room.
3. Set-up the testing as described in Chapter 4: Equipment Set-Up and Test Procedure.
4. Adjust the voltage input to the motor such that the RPM is exactly 200 RPM.
5. Take the air delivery reading in all of the four quadrants of the cylinder.

**Important Note:** Recalibration among all testing laboratories is likely to occur in the future, preserving the integrity of the Standard Calibration Fan is especially important. Any type of impact or mishandling can alter future calibrations. Handle the motor and blades carefully. Likewise, when shipping the Standard Calibration Fan, all efforts shall be made to protect the fan during shipping (i.e., use of bubble wrap, etc.).

- Calibration Approval

Calibration results shall be sent to EPA along with a cover letter requesting approval. The calibration results shall be submitted via the form provided in Appendix C of this manual. Once the calibration results are reviewed and approved by EPA, the testing facility will receive a memo stating that the facility may begin testing ceiling fans for ENERGY STAR qualification. The testing facility name will then be added to the ENERGY STAR Web site Qualified Laboratory List. **Note:** EPA reserves the right to ask for a recalibration of all testing facilities in the future.

## 5.2 Round-Robin

EPA will conduct annual “round-robin” testing of all approved laboratories to verify that test results fall within a certain percentage of each other depending on fan speed as described in Table 5.1, below. This process will be performed using a reference fan provided by EPA.

Round-robin instructions:

1. Assemble fan according to directions provided with the packaging. **Note:** It is important to follow directions as to where to attach blades and brackets. These locations should be numbered and documented by the first laboratory in the round robin if the blades and brackets are not already numbered upon receipt by that laboratory. Also, ensure the blade degree pitch for all blades is set to the manufacturer's specification, adjusting if necessary.
2. Hang the fan in the air delivery room.
3. Set-up the testing as described in Chapter 4: Equipment Set-Up and Test Procedure.
4. Take the air delivery reading in all of the four quadrants of the cylinder.

Air delivery results at the testing facilities **must be within the following percentages** of each other:

Fan Speed	Percent Proximity
Low	±10%
Medium	±7%
High	±5%

**Table 5.1 – Required Proximity of Air Delivery Results amongst Existing Testing Laboratories**

### 5.3 Reporting Test Results and Other Tips

Under the ENERGY STAR Program Requirements for Residential Ceiling Fans, manufacturers must provide testing documentation when submitting products for ENERGY STAR qualification. A full report shall be provided for each test run to the manufacturer. Again, all lab personnel shall be familiar with the reporting requirements provided in the ENERGY STAR specifications (Attachment A) prior to testing for ENERGY STAR qualification. Fan testing results must be recorded and presented in a format similar to that provided in Appendix C, of this manual.

In addition, there are a number of important requirements that lab personnel should be aware of and communicate to the manufacturer. These are listed below.

- Lighting Requirements

Under the ENERGY STAR specification, a ceiling fan model that will be sold with an attached or integral light kit must be tested with the light source mounted in its' intended position and switched off. If a ceiling fan model is sold both with and without a light kit, two separate tests must be performed. It is very important that lab personnel indicate on the testing results form whether or not the fan tested includes lighting.

In addition to the fan testing, the lighting itself is required to be tested under the ENERGY STAR Residential Light Fixtures program. Ceiling fan testing facilities are not required to provide this type of testing documentation; however laboratory personnel needs to be familiar with the requirement to test the light kit separately at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

It is important to inform the customer of these additional lighting requirements ahead of time to avoid delays in qualification.

- Other Testing Considerations and Recommendations

Ceiling fan models that are the same in every aspect but finish may qualify under the representative model that is tested. Differences in construction such as

housing, blade pitch, and motor could affect air movement and require separate testing. This testing procedure is intended to provide fan performance results for the complete ceiling fan model and shall not be used as a means to test individual components. Therefore, fans that DO NOT pass shall be sent back to the customer and a new fan submitted for qualification. Laboratory personnel shall not accept new components from a customer for means of a re-test.

Laboratory facilities may be asked to test a ceiling fan in response to an industry challenge. This occurs when one manufacturer challenges the test results of another manufacturer's product. In this case, EPA will ask one of the testing facilities to purchase the product and perform a complete test. Costs for the fan purchase, shipment, and testing will be covered by one of the two manufacturers, depending on the results. Results of the test shall be sent to EPA for review. Additional information on challenges can be found in the specification provide in Attachment A (Section 4: Test Criteria, Reporting Requirements).

Lab personnel shall also indicate the condition in which the fan was received, discrepancies in model numbers, and other concerns or inconsistencies.

## CHAPTER 6

### Definitions and Acronyms

#### 6.1 Definitions

**Actuator:** Mechanism that puts something into automatic action; motor driven. For purposes of this test procedure, the actuator holds and controls the height of the fan above the test cylinder.

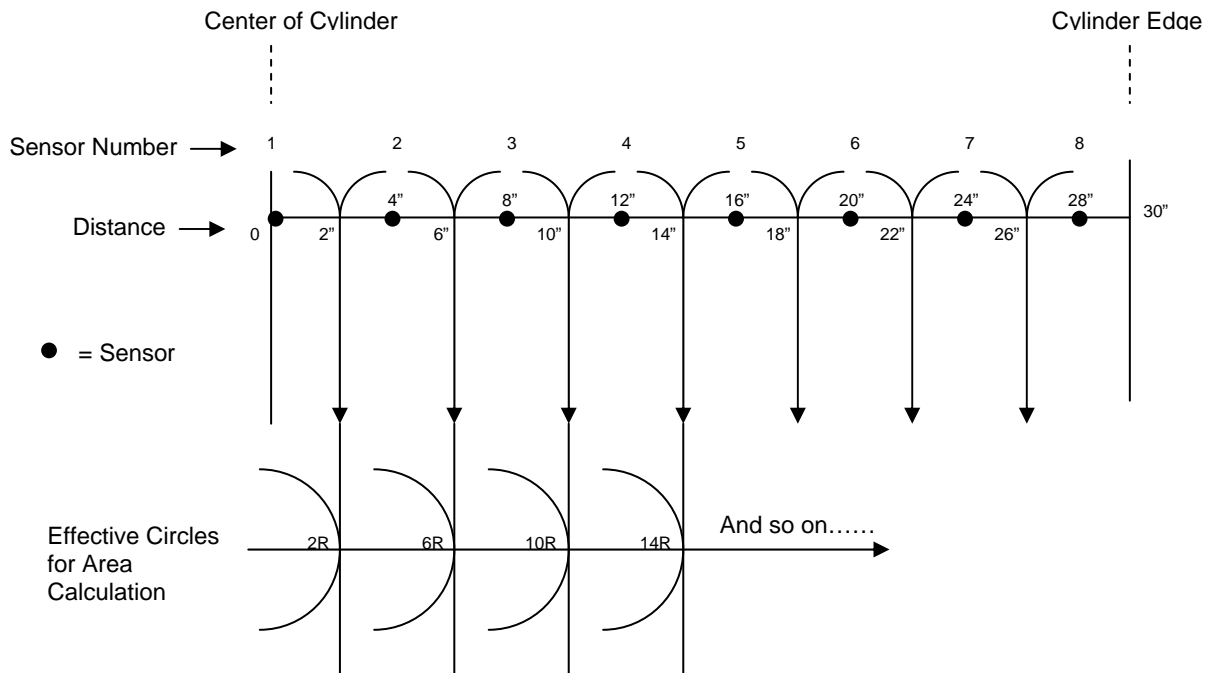
**Airflow:** The rate of air movement at a specific fan speed setting expressed in cubic feet per minute (CFM).

**Airflow Efficiency:** The ratio of airflow divided by power at a specific ceiling fan speed setting expressed in CFM per watt (CFM/watt).

**Attachable Light Kit:** Equipment that is used to provide light from the ceiling fan, and is not physically attached to the fan at the time of sale.

**Blade Pitch:** The angle between the fan's blades and the horizon.

**Circle Area:** Circular area over which the sensor can detect and record air delivery from a testing cylinder. For purposes of this test procedure, the following calculation was performed to determine circle area (see picture below):



Sensor #1 at 0"	$\pi (2/12)^2 = 0.0873 \text{ ft}^2$
Sensor #2 at 4"	$\pi [(6/12)^2 - (2/12)^2] = 0.6981 \text{ ft}^2$
Sensor #3 at 8"	$\pi [(10/12)^2 - (6/12)^2] = 1.3963 \text{ ft}^2$

**COM Port:** Of a device or network, a point of access where signals may be inserted or extracted, or where the device or network variables may be observed or measured; ability to communicate with external devices.

**Damper:** A device that decreases the amplitude of electronic, mechanical, acoustical, or aerodynamic oscillations. For purposes of this test procedure it is an airtight door that prevents external airflow into the testing room.

**Fan Housing:** The decorative body of the fan which encloses the motor.

**Fan Motor:** Device that turns the ceiling fan blades in order to move air.

**Fan Size:** Total diameter (circumference) of blade span; measured in inches at the blade tips.

**Integral Light Kit:** Equipment that is used to provide light from the ceiling fan, and is connected to the fan at the time of purchase. For purposes of this test procedure, the integral light kit must be attached at the time of testing.

**Infrared Beam:** Beam of light situated outside the visible spectrum at its red end, having a wavelength between about 700 nanometers and 1 millimeter; longer than visible light but shorter than radio waves. Infrared beam is used within the Tachometer to count the revolutions per minute (RPM).

**Representative Fan Model:** Prototype or fan model that is tested to qualify a line of products under the same model name and number. Those fans represented by this model must be the same in every aspect but finish.

**Sensor:** An electronic device used to measure a physical quantity such as temperature, pressure, loudness, or airflow and convert it into an electronic signal of some kind. Sensors are normally components of some larger electronic system such as a computer control and/or measurement system.

**Solid State Test Method:** Test method that specifies the apparatus and testing protocol for measuring a residential ceiling fan's airflow and power consumption. The method, developed by Hunter Fans, utilizes a thermister based hot-wire anemometer and requires a temperature controlled room and computer for recording test data.

**Tachometer:** Device that measures rotational motion; a speed indicator. Measurement is usually in revolutions per minute (RPM).

**Third Party Testing Facility:** Independent test facility that is not affiliated with the manufacturer.



## 6.2 Acronyms

CFM	Cubic feet per minute
EPA	Environmental Protection Agency
FPM	Feet per minute
ITS	Intertek Testing Services
NVLAP	National Voluntary Laboratory Accreditation Program
RMS	Root Mean Square
RPM	Revolutions per minute
UL	Underwriters Laboratory

## **APPENDIX A**

### **ENERGY STAR Program Requirements for Residential Ceiling Fans: Eligibility Criteria**



# ENERGY STAR® Program Requirements for Residential Ceiling Fans

## Eligibility Criteria

Below is the Version 2.2 product specification for ENERGY STAR qualified residential ceiling fans. A product must meet all of the identified criteria to earn the ENERGY STAR.

- 1) **Definitions:** Below are the definitions of the relevant terms in this document. For lighting or light kit related terminology and definitions, refer to section 1) *Definitions* in the ENERGY STAR Version 4.2 Specification for Residential Light Fixtures.
  - A. **Residential Ceiling Fan:** A non-portable device designed for home use that is suspended from the ceiling for circulating air via the rotation of fan blades. Some ceiling fans also have an integral or attachable light kit.
  - B. **Light Kit:** A complete lighting unit consisting of lamp(s) and ballasting (when applicable) or LED Light Engine(s), together with the parts designed to distribute the light, position and protect the lamps, and connect the lamps to the mains. Light kits can be:
    - Integral – the light kit is attached to the ceiling fan housing at the time of purchase. This type of a light kit is integrated into the bottom cap of the fan and cannot be removed or replaced with another light kit.
    - Attachable – the light kit is not, at the time of sale, physically attached to the fan. The light kit must be attached to the ceiling fan for the lights to work. Attachable light kits might be included inside the ceiling fan box at the time of sale or sold separately for subsequent attachment to the fan.
  - C. **Controls:** Controls enable the user to turn on/off or adjust the lighting and fan movement. Controls may be in the form of pull chain, slide switch, wall switch/panel, or remote control.
  - D. **Airflow:** The rate of air movement at a specific fan setting expressed in cubic feet per minute (CFM). Airflow is determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - E. **Airflow Efficiency:** The ratio of airflow divided by power at a specific residential ceiling fan setting expressed in CFM per watt (CFM/watt). Airflow and power are determined from testing done using the Solid State Test Method as defined in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - F. **Power Consumption:** Defined as the active power and expressed in watts. Power consumption is measured during residential ceiling fan testing at a specific speed using the test procedure described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.
  - G. **Solid State Test Method:** A test method that specifies the apparatus and testing protocol for measuring a residential ceiling fan's airflow and power consumption. The method utilizes a hot-wire anemometer and requires a temperature controlled room and computer for recording test data.

H. **Hugger Fan:** A fan style where the motor mounts directly to the ceiling. Hugger fans are most commonly used in rooms with low ceilings. Hugger fans are manufactured and marketed as such and should not be confused with multi-mount (traditional) fans that can be hung without the down rod, giving the same effect as a hugger fan. Hugger fans are designed to allow installations on 7'6" – 8' height ceilings when using a fan light kit in a location where walking under the fan will occur.

- 2) **Qualifying Products:** In order to qualify as ENERGY STAR, a residential ceiling fan must meet the definition in Section 1A and the specification requirements provided in Sections 3 through 7, below. Ceiling fan light kits, integral and attachable, must meet the definition in Section 1B and the requirements provided in Appendix A. Hugger fans cannot qualify as ENERGY STAR under this Version 2.2 specification.

3) **Performance Specification and Lighting Requirements for Qualifying Products:**

A. **Airflow Efficiency**

Qualifying products shall meet or exceed the following minimum requirements for total airflow and airflow efficiency when operating in a downward-blowing direction. Models sold with light kits or integrated light sources must be tested with those light sources mounted in their intended position and switched off. The representative model's (i.e., unit shipped to test facility) measured performance may vary by 5 percent of the performance levels provided in Table 1, below, at the time of testing and still be deemed compliant with this specification. These test results may then be used to represent the performance of all individual units sold under the same brand and model name, including those units sold with different finishes (as listed on the ENERGY STAR qualifying product list). Each individual unit must perform within 5 percent of the tested representative model to be compliant with this specification.

As of **October 1, 2004**, tested representative model (i.e., unit shipped to test facility) must meet the minimum requirements listed in Table 1, below, without the assistance of the 5 percent tolerance at the time of testing. Once a representative model has qualified as ENERGY STAR, all additional units manufactured under the same model name/number, and found in the distribution channel (i.e., retail), must perform within 5 percent of the tested performance levels submitted to EPA and listed on the ENERGY STAR Web site.

Table 1 –Air Flow Efficiency Requirements		
Fan Speed	Minimum Airflow	Efficiency Requirement
Low	1,250 CFM	155 CFM/watt
Medium	3,000 CFM	100 CFM/watt
High	5,000 CFM	75 CFM/watt

This specification defines residential ceiling fan airflow efficiency on a performance basis: CFM of airflow per watt of power consumed by the motor and controls. This treats the motor, blades, and controls as a system, allowing multiple approaches to reach a given efficiency level. Efficiency is to be measured on each of three fan speeds (low, medium, high) using the "Solid State Test Method," which is explained in more detail in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

For those ceiling fan models that offer more than three speeds (e.g., low, medium, high), manufacturer may choose the three individual speed settings that should be used to comply with the performance levels set forth in Table 1 above. However, at the time of testing measurements should be taken and reported for all discrete operating speeds. If more than three speeds are listed in the

Performance Table, required in Section 7 of this specification, manufacturer should indicate which speeds qualify as ENERGY STAR.

## B. Lighting

All integral and attachable light kits must meet the requirements found in Appendix A of this ENERGY STAR specification. Partner should use the Ceiling Fan Qualified Product Information (QPI) form to report qualifying light kits.

Qualifying residential ceiling fans sold without integral or attachable light kits must provide information on product packaging or with product instructions regarding ENERGY STAR qualifying light kits that may be used with that particular residential ceiling fan.

- 4) **Controls**: Qualifying products shall permit convenient consumer adjustment of fan speed. This may be accomplished by means of one or more wall-mounted switch(es), a remote control, or readily accessible pull chains. For purposes of this specification, “readily accessible” shall be defined as a length sufficient to reach a height of no more than 80 inches (203 cm) above the floor when the residential ceiling fan is mounted according to the residential ceiling fan’s installation instructions. For those residential ceiling fans that can accommodate light kits, the lights and the fans must be able to be controlled separately, allowing users to switch off lights during fan operation or operate the lights without using the residential ceiling fan.

Qualifying products shall also provide for consumer adjustment of airflow direction (upward or downward) by one of the following means:

- A vertically or horizontally mounted slide switch on the motor housing. For vertically mounted switches, the downward position must correspond to downward airflow. For horizontally mounted switches, airflow direction must be clearly identified on the switch housing or within the product literature.
- A wall-mounted switch
- A remote control
- A readily accessible pull chain

- 5) **Sound**: No requirements at this time.

- 6) **Minimum Warranty**: Qualifying products shall provide a warranty of at least 30 years for the motor and at least one year for all other components of qualifying residential ceiling fans. All ceiling fan light kits (i.e., integral and sold separately) also shall meet applicable warranty requirements as listed in Appendix A.

- 7) **Consumer Information**: In addition to the ENERGY STAR mark, packaging of ENERGY STAR qualified residential ceiling fan models shall also state airflow, fan power consumption, and airflow efficiency at each of their three operating speeds, as determined by the test procedures specified in Section 3A, Airflow Efficiency. If the ceiling fan model offers more than three speeds, performance results should be provided for all speeds on the packaging, indicating which three speeds were used to qualify the fan as ENERGY STAR. This information shall appear in the following form on the outside portion of the package:

Fan Speed	Airflow	Fan Power Consumption (without lights)	Airflow Efficiency (higher is better)
Low	CFM	watts	CFM/watt
Medium	CFM	watts	CFM/watt
High	CFM	watts	CFM/watt

Product operating and installation instructions shall include a short list of standardized information regarding how to operate the products efficiently. This list shall include, at a minimum, information about the following topics:

- adjusting fan speed and direction for season and room occupancy to maximize energy savings
- HVAC thermostat adjustment for energy savings when a ceiling fan is in use
- proper mounting distance from the ceiling to maximize efficient operation
- how to find proper replacement lamps for the light kit, if included

- 8) **Testing and Reporting Procedures:** Manufacturers are required to perform tests and self-certify each representative model that they intend to qualify as ENERGY STAR. In performing these tests, laboratories must use the test method described in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*. When testing ceiling fan light kits, manufacturers must meet the testing and documentation requirements included in Appendix A.

A. Laboratory Testing

Under this specification, ceiling fans may only be tested by those laboratories that meet the guidelines provided in EPA's ENERGY STAR Testing Facility Guidance Manual and have been approved to test for ENERGY STAR qualification. EPA will conduct annual "round-robin" testing of these laboratories (i.e. calibrations), to verify that test results fall within +/- 5 percent of each other. This process will be performed using a reference fan provided by EPA. Laboratories that can test and qualify ceiling fans under ENERGY STAR, can be downloaded from the ENERGY STAR Web site at [www.energystar.gov/partners](http://www.energystar.gov/partners). Additional direction regarding the laboratory calibration procedure is provided in EPA's *ENERGY STAR Testing Facility Guidance Manual: Building a Testing Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*.

B. Reporting Requirements

The company whose brand name appears on the product packaging shall, for purposes of this specification, be considered the manufacturer. Manufacturers must complete a QPI form when submitting qualified products to EPA. This form must be accompanied by reports from a qualified laboratory containing airflow, power consumption, airflow efficiency data, and lighting test results (where applicable) for each residential ceiling fan model and light kits proposed for qualification. Families of residential ceiling fan models that are identical in every respect but finish may be qualified through submission of test data for a single representative model. Likewise, models that are unchanged or that differ only in finish from those sold in a previous year may remain qualified without the submission of new test data, assuming the specification remains unchanged. However, separate test data are required for all models that differ in any of the following characteristics:

- motor type or size
- rotational speed
- control type (if included with fan)
- blade weight, number, size, or pitch
- housing (i.e., size, design, ventilation)

C. Product Performance Review Process

To the extent ENERGY STAR is a self-certification program, EPA relies on the integrity of participating companies to ensure all products for which ENERGY STAR claims are made, meet all aspects of the ENERGY STAR performance specification. When mistakes are made and products are mislabeled or fail to perform as expected, EPA is committed to ensuring prompt corrective action.

In the event EPA is provided test data or other product information indicating a performance problem or mislabeling situation, EPA will take the following steps:

1. Inform the product manufacturer about the apparent performance and/or labeling problem.
2. Ask the product manufacturer to withdraw the product (i.e. model number) from the ENERGY STAR qualified product list and stop labeling -OR- affirm the basis for qualification by supplying any relevant test data not already provided.
3. In the event that a definitive conclusion cannot be reached based on the manufacturer's response, EPA will make every effort to test the product in question as part of its in-use screening initiative.
4. If EPA concludes, based on testing performed on behalf of EPA in accordance with the ENERGY STAR specified test procedure, that the product in question does not fully qualify with the ENERGY STAR performance criteria, the product manufacturer will be asked to provide a "corrective action" plan to EPA outlining the process by which the product will be modified and retested so that qualification with the specification will be demonstrated within 90 days. If the product manufacturer fails to submit a corrective action plan or exceeds the deadline for implementing it, the product in question will be removed from the Qualified Product List on the ENERGY STAR Web site.

9) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR, under the Version 2.2 specification, will be defined as the *effective date* of the agreement. The ENERGY STAR Residential Ceiling Fan (Version 2.2) specification shall become effective on **June 2, 2008**. Products qualified under Version 2.1 remain qualified under Version 2.2.

- A. **Qualifying and Labeling Products Under the Version 2.2 Specification:** All products, including models originally qualified under Version 2.1, with a **date of manufacture** on or after **June 2, 2008**, must meet the Version 2.2 requirements in order to bear the ENERGY STAR mark on the product or in product literature. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.
- B. **Elimination of Grandfathering:** EPA will not allow grandfathering under this Version 2.2 ENERGY STAR specification. **ENERGY STAR qualification under Version 2.2 is not automatically granted for the life of the product model.** Therefore any product sold, marketed, or identified by the manufacturing partner as ENERGY STAR qualified must meet the current specification in effect at that time.

10) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions.

## **APPENDIX B**

### **ENERGY STAR Qualified Product Information Form**



United States



# ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

## Qualified Product Information Form for Residential Ceiling Fans Version 2.2 Office of Atmospheric Programs

**ENERGY STAR® product information form for use by ENERGY STAR qualified residential ceiling fan partners  
(Companies who have joined ENERGY STAR for residential ceiling fans by signing a Partnership Agreement)**

*You may use this form to report only those products that are sold under the company's brand name. If your firm sells its models to another company that uses its own brand name, that company must join ENERGY STAR and report its own products. Information from this form will be added to the list of ENERGY STAR qualified residential ceiling fan products. Please copy this form and return one for each qualifying product model to the address provided in Section XI of this form.*

**Company Name:** \_\_\_\_\_  
**(As listed in Partnership Agreement)**

**Product Contact Information**  
**(For public requesting product information)**

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

### Product Category (please check one)

- ☐ Ceiling Fan only
- ☐ Ceiling Fan with Light Kit – Pin Based CFLs
- ☐ Light Kit Only – Pin Based

**I. Product Information** – List representative (tested) model first. Models that are identical to the representative model in every respect but finish may be listed in the table below.

Brand Name	Model Name	Model Number*	Retailer SKU Number (if available)	Lamp Shipped w/ Model? (Light Kits only)
				<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N
Fan Size (in.): _____	Please Attach Fixture Description (Light Kit) <sup>1</sup>			

\* Please include available finishes for the representative model; use additional sheets, if necessary, and attach to this QPI form.

<sup>1</sup> The fixture description should include brief information about finish, glass types, and any other aesthetics for consumer benefit. Descriptions may be submitted either electronically or as an attachment to this form.

## II. Ceiling Fan Airflow Efficiency

Fan Speed	Airflow (CFM)	Fan Power Consumption (watts)	Airflow Efficiency (CFM/watt)

## III. Ceiling Fan Controls

Provide type and location of fan controls (wall-mounted switch, pull chain, remote control):

Type of Fan Speed Control	Location of Fan Speed Control	Type of Airflow Direction Control	Location of Airflow Direction Control

## IV. Lighting Requirements (for all ceiling fan light kits: integral, attachable, or sold separately)

**Pin-Based:** Light kit must be tested and qualify under Appendix A of the ENERGY STAR Version 2.2 Residential Ceiling Fan specification. Please provide test results in Section VIII of this form. Testing documentation must be submitted with this form. **Note: If lamp/ballast combination has already been tested by OEM or other entity, you may submit an ENERGY STAR lamp/ballast qualification letter (provided by the OEM) in lieu of testing documentation, where applicable. Please note that some additional documentation may be required for qualification.**

Manufacturer: \_\_\_\_\_  
Model/Product #: \_\_\_\_\_  
CFL Wattage: \_\_\_\_\_  
Number of CFLs Included in Packaging: \_\_\_\_\_

## V. Warranty Requirements

**Note:** Ceiling fans and/or light kits must meet the following minimum requirements:

Motor:  $\geq$  30 years  
Fan Components:  $\geq$  1 year  
Light Kits:  $\geq$  2 years

Motor Warranty: \_\_\_\_\_ years  
List Fan Components and their Warranties: \_\_\_\_\_  
Light Kit Warranty: \_\_\_\_\_ years

## VI. Labeling Requirements

By checking the boxes below, you are confirming that you have reviewed and will meet the labeling requirements outlined in the ENERGY STAR Program Requirements for Residential Ceiling Fans. These requirements include:

☐ On product packaging/box ☐ In product literature ☐ On Internet site

Will the Performance and Efficiency Table be clearly displayed on the outside of the product packaging (Ceiling Fans only)?

☐ Yes ☐ No

## VII. Ceiling Fan Testing

All manufacturers are required to perform tests on residential ceiling fan models by using the Solid State Test Method described in the Testing Facility Guidance Manual: *Building a Test Facility and Performing the Solid State Test Method for ENERGY STAR Qualified Ceiling Fans*. Fan models identical in every respect but finish may be represented by a single representative model for testing purposes. However, separate test data is required for all models that differ in motor type or size, housing size/shape/design, rotational speed, control type, or blade weight, number, size, or pitch. **Laboratory test results must be attached to this form for a model to qualify as ENERGY STAR.**

Tested By: (Name of Qualified Testing Facility) \_\_\_\_\_

Date Available (on market): \_\_\_\_\_

## VIII. Light Kit Test Results

**Note:** Data and information needed to complete this section can be provided by an accredited public or private laboratory, by the OEM, or from an industry association, with the exception of the 2-year warranty and Safety Documentation, which should be supplied by the ceiling fan manufacturer. Values provided in the testing documentation must match those values that are entered in the Test Results table, below.

Please check if applicable:

☐ Submittal includes an ENERGY STAR lamp/ballast qualification letter for Version 4.0 of the Indoor Residential Lighting Fixture Specification.

LAMP & BALLAST INFORMATION:						
*Number of Lamps/ Fixture	Number of Ballasts/ Fixture	*Individual Listed Lamp Wattage	*Lamp Type <sup>1</sup>	Lamp Size <sup>2</sup>	Lamp (e.g., light bulb) Manufacturer & Model Number	Ballast Manufacturer & Model Number

1. Lamp Type: For example, CFL = Compact Fluorescent, CR = Circular, L = Linear  
2. Lamp Size: For example, T4, T5, or T8.  
(For ENERGY STAR use only) Generic Lamp Code: \_\_\_\_\_

TEST RESULTS: Enter results from test report (complete using average of three or more samples) or manufacturer data as specified in the ENERGY STAR Program Requirements for Residential Light Fixtures Version 3.2 and attach required documentation to this form.		
Performance Characteristic	Test Result	Required Documentation (please attach to this form)
Efficacy	_____ Total Lumen Output [2]	Test report from a lab accredited by NVLAP or other EPA approved documentation.
	_____ *Input Power (watts) [3]	
	_____ Lumens Per Watt	
Lamp Life	_____ Average Rated Hours	Test report from a lab accredited by NVLAP or one of its MRA signatories, an EPA approved Platform Letter of Qualification,

<sup>2</sup> Total Lumen Output = (Lumens) x (# Lamps per Fixture) x (# Ballasts per fixture) x (Ballast Factor)

<sup>3</sup> From ballast specification

Lumen Maintenance	_____ % of initial lumens at 40% rated lamp life (4,000 hour minimum)	EPA-approved documentation from an industry association, or a test report from an ISO 9000 registered facility.
*Lamp Color Rendering (CRI)	_____ CRI	Test report from a lab accredited by NVLAP or other EPA approved documentation.
*Lamp Correlated Color Temperature (CCT)	Target CCT (circle one) <input type="checkbox"/> 2700K <input type="checkbox"/> 3000K <input type="checkbox"/> 3500K <input type="checkbox"/> 4100K <input type="checkbox"/> 5000K <input type="checkbox"/> 6500K	Test report from a lab accredited by NVLAP or other EPA approved documentation.
	Samples falling within 7-step Mac Adam ellipse _____%	
Lamp/Lampholder Compatibility	List ANSI-IEC Designated <b>Lamp Base Type</b> _____	No documentation required at time of submittal.
	ANSI-IEC Standardized <b>Lamp?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	For fixtures that do not use an ANSI-IEC standardized lamp from ANSI C78.901 & C78.81 or IEC 60901 & 60081, supply a lamp manufacturer specification sheet.
	If "Yes", list ANSI-IEC <b>Lamp</b> Standard Data Sheet Number _____ OR <input type="checkbox"/> N/A	
Lamp Labeling Requirement	Check box if lamp labeling requirement has been met: <input type="checkbox"/>	A copy of the actual language that will be included on the lamp base or glass.
<b>Ballast Requirements</b>		
Lamp Start Time	_____ Milliseconds	Test report from a lab accredited by NVLAP or one of its MRA signatories, an EPA approved Platform Letter of Qualification, EPA-approved documentation from an industry association, or a test report from an OSHA NRTL laboratory.
Power Factor	_____	Test report from a lab accredited by NVLAP or one of its MRA signatories, an EPA approved Platform Letter of Qualification, EPA-approved documentation from an industry association, or a test report from the ballast or fixture manufacturer.
Lamp Current Crest Factor	_____	Test report from a lab accredited by NVLAP, or one of its MRA Signatories, or a lab accredited by an OSHA NRTL, or other EPA approved documentation
Maximum Recommended Ballast Case Temperature During Normal Operation Inside Light Kit(s)	_____ degrees Celsius	Manufacturer or laboratory data
Maximum Measured Ballast Case Temperature During Normal Operation Inside Light Kit(s)	_____ degrees Celsius	Test report from a lab accredited by NVLAP or one of its MRA signatories, an OSHA NRTL laboratory, or the fixture or ballast manufacturer.
Electromagnetic and Radio Frequency Interference	Check box if the ballast meets FCC requirements for consumer use: <input type="checkbox"/>	No documentation required at time of submittal.
Ballast Frequency (Required for all electronic ballasts)	_____ kHz	Test report from a lab accredited by NVLAP or one of its MRA signatories, an EPA approved

Transient Protection (Required for all electronic ballasts)	Check box if ballast meets transient protection requirements: <input type="checkbox"/>	Platform Letter of Qualification, EPA-approved documentation from an industry association, or a test report from the ballast or fixture manufacturer.
End of Life Protection (Required for electronic ballasts with lamps sized T5 & smaller)	Testing requirements met? <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Manufacturer data or laboratory engineering description outlining the scheme that is used to achieve end of life function within the ballast
	Maximum number of lamps shut down when lamp end of life event occurs: _____ OR <input type="checkbox"/> N/A	
Dimming	Dimming-Capable Ballast? <input type="checkbox"/> Yes <input type="checkbox"/> No	No documentation required at time of submittal.
	If "Yes", Indicate Dimming Mechanism <input type="checkbox"/> 3-Way Switching <input type="checkbox"/> Continuous Dimming	
Safety – Ballasts and "Non Edison base Fluorescent Adapters"	Listed for Safety? <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Cover page of a safety test report or a general coverage statement.
<b>Light Kit Requirements</b>		
Light Kit Warranty	Check box if fixture warranty is included with light kit packaging: <input type="checkbox"/>	2-Year Written Fixture Warranty
Noise	_____ dBA	Manufacturer or laboratory data
Lamp Shipment Requirement	Lamp(s) intended for use with light kit(s) included? <input type="checkbox"/>	No documentation required at time of submittal.
Replaceable Ballast	Check box if the submitted light kit(s) meet(s) the replaceable ballast requirement: <input type="checkbox"/>	A copy of the language that includes guidance on ballast replacement and states that the ballast is replaceable with the use of a "qualified electrician" without the cutting of wires.
Safety – Hardwired Fixtures	Listed for Safety? <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Cover page of a safety test report or a general coverage statement included
Product Packaging for Consumer Awareness Requirements	Does the packaging clearly describe the target CCT designation in Kelvin? <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Written copy or PDF graphic of the language that will be displayed on product packaging and within the packaging, as required.

\* Items with an asterisk will appear on the ENERGY STAR Web site.

## IX. Additional Information

Please list all major retailers that carry the product (attach a list if necessary): \_\_\_\_\_

Please check one or more of the following international markets where these products are sold (if applicable)?

☐ Australia/New Zealand    ☐ Canada    ☐ EU    ☐ Japan    ☐ Mexico    ☐ Taiwan

This Qualified Product Information Form and the Program Requirements for Residential Ceiling Fans can be found in the Partner Resources section of the ENERGY STAR Web site at [www.energystar.gov](http://www.energystar.gov).

## X. Declaration

☐ By checking this box, I declare that the information submitted via this form is, to the best of my knowledge, accurate and associated with the products included for qualification in this submittal. I understand that the ENERGY STAR Program will associate all data in this submittal with the products listed in this submittal upon receipt. I understand that if any of the submitted information is found to be inaccurate, the products will be removed from the ENERGY STAR qualified products list. I understand that intentionally submitting false information to the U.S. government is a criminal violation of the False Statements Act, Title 19 U.S.C. section 1001.

Date: \_\_\_\_\_

## XI. Contact Information:

Please submit your completed Qualified Product Information Form and testing documentation using one of the following ways:

**E-mail:** [CeilingFans@energystar.gov](mailto:CeilingFans@energystar.gov)

**Fax:** (202) 862-1144

**US Mail/Overnight/Express:** 1725 Eye Street NW, Suite 1000, Washington, DC 20006

The public reporting and recordkeeping burden for this collection of information is estimated to average 4.85 hours or minutes per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

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ENERGY STAR, US EPA, 1200 Pennsylvania Ave., MC 6202J, Washington, DC 20460 USA  
Toll-free number 1-888-STAR-YES, Web site <http://www.energystar.gov>

ENERGY STAR is a registered mark.

## **APPENDIX C**

### **Laboratory Reporting Form(s)**

















## **APPENDIX D**

### **Engineering Blueprints for Air Delivery Room**

**(Please see the "Ceiling Fans for Partners" page on the  
ENERGY STAR Web site, <http://www.energystar.gov>)**